

What is claimed is:

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1. An image display method, which has an output
brightness characteristic in which a logarithmic value of an output
brightness becomes smaller as a value of an input image signal
5 becomes larger, for displaying a visible image that said image
signal represents according to said output brightness
characteristic, the image display method comprising the step of:

10 setting said output brightness characteristic so that
a rate of change, which represents a change in a logarithmic value
of said output brightness with respect to a change in said signal
value, in a low signal value region of said image signal becomes
smaller than that in an intermediate and high signal value region
of said image signal.

2. The image display method as set forth in claim 1,
15 wherein said output brightness characteristic is approximately
linear over approximately the entire intermediate and high signal
value region.

3. The image display method as set forth in claim 1,
wherein a boundary value S_a between said low signal value region
20 and said intermediate and high signal value region, and a
logarithmic value $Y(S_a)$ of said output brightness at said boundary
value S_a are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

where S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

5 4. The image display method as set forth in claim 2, wherein a boundary value S_a between said low signal value region and said intermediate and high signal value region, and a logarithmic value $Y(S_a)$ of said output brightness at said boundary value S_a are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$
$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

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15 where S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

20 5. The image display method as set forth in claim 1, wherein said change rate in said intermediate and high signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

25 where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

6. The image display method as set forth in claim 2,

wherein said change rate in said intermediate and high signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

7. The image display method as set forth in claim 3, wherein said change rate in said intermediate and high signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

8. The image display method as set forth in claim 1, wherein said output brightness characteristic is set so that said change rate in the high signal value region of said image signal becomes greater than that in the intermediate signal value region of said image signal.

9. The image display method as set forth in claim 8, wherein said output brightness characteristic is approximately linear over approximately the entire intermediate signal value region and over approximately the entire high signal value region.

10. The image display method as set forth in claim 8, wherein a boundary value S_a between said low signal value region

and said intermediate and high signal value region, a logarithmic value $Y(S_a)$ of said output brightness at said boundary value S_a , a boundary value S_b between said intermediate signal value region and said high signal value region, and a logarithmic value $Y(S_b)$ of said output brightness at said boundary value S_b are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$0.70 \times S_{\max} \leq S_b \leq 1.00 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

$$Y_{\max} - 2.15 \leq Y(S_b) \leq Y_{\max} - 1.95$$

where S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

11. The image display method as set forth in claim 9, wherein a boundary value S_a between said low signal value region and said intermediate and high signal value region, a logarithmic value $Y(S_a)$ of said output brightness at said boundary value S_a , a boundary value S_b between said intermediate signal value region and said high signal value region, and a logarithmic value $Y(S_b)$ of said output brightness at said boundary value S_b are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$0.70 \times S_{\max} \leq S_b \leq 1.00 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

$$Y_{\max} - 2.15 \leq Y(S_b) \leq Y_{\max} - 1.95$$

5 where S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

12. The image display method as set forth in claim 8, wherein said change rate in said intermediate signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

15 where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

13. The image display method as set forth in claim 9, wherein said change rate in said intermediate signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

25 14. The image display method as set forth in claim 10, wherein said change rate in said intermediate signal value region

is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

5 where S_{\max} is the maximum value of the image signal in said output brightness characteristic and G is said change rate.

15. In an image display unit, which comprises a
brightness circuit having an output brightness characteristic in
which a logarithmic value of an output brightness becomes smaller
as a value of an input image signal becomes larger, for displaying
a visible image that said image signal represents according to said
output brightness characteristic,

the improvement wherein said output brightness
characteristic in said brightness circuit is set so that a rate
of change, which represents a change in the logarithmic value of
said output brightness with respect to a change in said signal value,
in a low signal value region of said image signal becomes smaller
than that in an intermediate and high signal value region of said
image signal.

16. The image display unit as set forth in claim 15,
wherein said output brightness characteristic in said brightness
circuit is approximately linear over approximately the entire
intermediate and high signal value region.

17. The image display unit as set forth in claim 15,
wherein a boundary value S_a between said low signal value region
and said intermediate and high signal value region, and a

logarithmic value $Y(S_a)$ of said output brightness at said boundary value S_a are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

in which S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

18. The image display unit as set forth in claim 16, wherein a boundary value S_a between said low signal value region and said intermediate and high signal value region, and a logarithmic value $Y(S_a)$ of said output brightness at said boundary value S_a are represented by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

in which S_{\max} is the maximum value of the image signal in said output brightness characteristic and Y_{\max} is the maximum value of the logarithmic value of the brightness in said output brightness characteristic.

19. The image display unit as set forth in claim 15, wherein said change rate in said intermediate and high signal value region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

in which S_{\max} is the maximum value of the image signal in said output
5 brightness characteristic and G is said change rate.

20. The image display unit as set forth in claim 16,
wherein said change rate in said intermediate and high signal value
region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

in which S_{\max} is the maximum value of the image signal in said output
brightness characteristic and G is said change rate.

21. The image display unit as set forth in claim 17,
15 wherein said change rate in said intermediate and high signal value
region is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

20 in which S_{\max} is the maximum value of the image signal in said output
brightness characteristic and G is said change rate.

22. The image display unit as set forth in claim 15,
wherein said output brightness characteristic in said brightness
circuit is set so that said change rate in the high signal value
25 region of said image signal becomes larger than that in the
intermediate signal value region of said image signal.

23. The image display unit as set forth in claim 22,
wherein said output brightness characteristic in said brightness
circuit is approximately linear over approximately the entire
intermediate signal value region and over approximately the entire
high signal value region.

24. The image display unit as set forth in claim 22,
wherein a boundary value S_a between said low signal value region
and said intermediate and high signal value region, a logarithmic
value $Y(S_a)$ of said output brightness at said boundary value S_a ,
a boundary value S_b between said intermediate signal value region
and said high signal value region, and a logarithmic value $Y(S_b)$
of said output brightness at said boundary value S_b are represented
by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$0.70 \times S_{\max} \leq S_b \leq 1.00 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

$$Y_{\max} - 2.15 \leq Y(S_b) \leq Y_{\max} - 1.95$$

in which S_{\max} is the maximum value of the image signal in said output
brightness characteristic and Y_{\max} is the maximum value of the
logarithmic value of the brightness in said output brightness
characteristic.

25. The image display unit as set forth in claim 23,
wherein a boundary value S_a between said low signal value region
and said intermediate and high signal value region, a logarithmic

value $Y(S_a)$ of said output brightness at said boundary value S_a ,
a boundary value S_b between said intermediate signal value region
and said high signal value region, and a logarithmic value $Y(S_b)$
of said output brightness at said boundary value S_b are represented
5 by the following equations:

$$0.05 \times S_{\max} \leq S_a \leq 0.30 \times S_{\max}$$

$$0.70 \times S_{\max} \leq S_b \leq 1.00 \times S_{\max}$$

$$Y_{\max} - 0.25 \leq Y(S_a) \leq Y_{\max} - 0.05$$

$$Y_{\max} - 2.15 \leq Y(S_b) \leq Y_{\max} - 1.95$$

in which S_{\max} is the maximum value of the image signal in said output
brightness characteristic and Y_{\max} is the maximum value of the
logarithmic value of the brightness in said output brightness
characteristic.
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26. The image display unit as set forth in claim 22,
wherein said change rate in said intermediate signal value region
is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

in which S_{\max} is the maximum value of the image signal in said output
brightness characteristic and G is said change rate.

27. The image display unit as set forth in claim 23,
wherein said change rate in said intermediate signal value region
is represented by the following equation:
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$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

in which S_{\max} is the maximum value of the image signal in said output
 5 brightness characteristic and G is said change rate.

28. The image display unit as set forth in claim 24,
 wherein said change rate in said intermediate signal value region
 is represented by the following equation:

$$-(3.0/S_{\max}) \leq G \leq -(2.5/S_{\max})$$

in which S_{\max} is the maximum value of the image signal in said output
 brightness characteristic and G is said change rate.

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